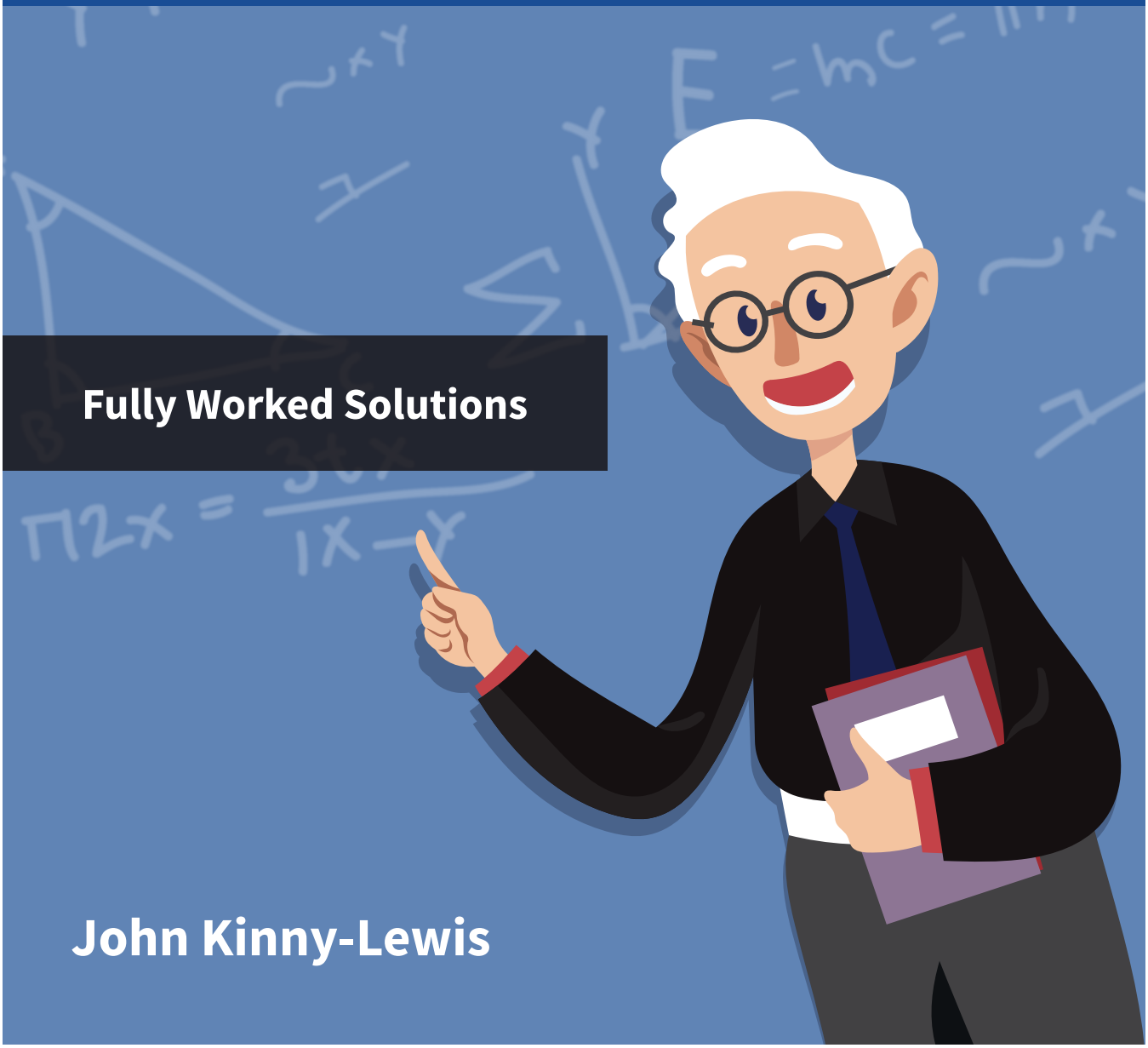
NSW Curriculum

class mathematics

7

YEAR 7 ALGEBRA

MASTERING ALGEBRA IN YEAR 7



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John Kinny-Lewis

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Chapter 1

Algebra and Equations

The Law of Arithmetic 1.1

The Distributive Law 1.2

Variables 1.3

From Words To Algebraic Expressions 1.4

Substitution 1.5

Equations - Guess and Check 1.6

One Step Equations (Add and Subtract) 1.7

One Step Equations (Multiply and Divide) 1.8

Two-Step Equations 1.9

Two Step Equations (Harder) 1.10

Equation Problems 1.11

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Question 1 MARKS: I (1) II (1) ANSWER

Evaluate

(i) $24 + 5 + 6$
(ii) $-6 + 12$

Question 2 MARKS: I (1) II (1) ANSWER

Evaluate

(i) $16 \times 5 \times 2$
(ii) $25 \times 11 \times 4$

Question 3 MARKS: I (1) II (1) ANSWER

Evaluate

(i) 7×50
(ii) 7×300

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Question 4 MARKS: I (1) II (1) ANSWER

Evaluate

(i) $24 + 7 + 5 + 3$
(ii) $7 \times 2 \times 5 \times 7$

Question 5 MARKS: I (1) II (1) ANSWER

Evaluate

(i) $71 + 6 + 29 + 5$
(ii) $17 + 21 + 3$

Question 6 MARKS: I (1) II (1) ANSWER

Evaluate

(i) $6 \times 6 \times 5$
(ii) $5 \times 13 \times 4$

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Question 7 MARKS: I (1) II (1) ANSWER

Evaluate

(i) 80×20
(ii) 6×600

Question 8 MARKS: I (1) II (1) ANSWER

Use the distribution law to evaluate:

(i) 18×11
(ii) 15×12

Question 9 MARKS: I (1) II (1) ANSWER

Evaluate

(i) $81 + 7 + 19 + 13$
(ii) $2 \times 7 \times 5 \times 8$

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Question 10 MARKS: I (1) II (1) ANSWER

Use the distribution law to evaluate:

(i) 18×11
(ii) 15×12

Question 11 MARKS: I (1) II (1) ANSWER

Use the distribution law to evaluate:

(i) 18×9
(ii) 15×8

Question 12 MARKS: I (1) II (1) ANSWER

Use the distribution law to evaluate:

(i) 21×101
(ii) 16×102

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Question 13 MARKS: I (1) II (1) ANSWER

Use the distribution law to evaluate:

(i) 25×99
(ii) 14×98

Question 14 MARKS: I (1) II (1) ANSWER

Use the distribution law to evaluate:

(i) 28×11
(ii) 28×9

Question 15 MARKS: I (1) II (1) ANSWER

Use the distribution law to evaluate:

(i) 65×101
(ii) 72×99

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Question 16 MARKS: I (1) II (1) ANSWER

Simplify each expression

(i) $6 \times a \times b \times 3$
(ii) $2 \times b \times b \times 3$

Question 17 MARKS: I (1) II (1) ANSWER

Simplify each expression

(i) $5 \times m + 3 \times m$
(ii) $6 \times d - 4 \times d$

Question 18 MARKS: I (1) II (1) ANSWER

Simplify each expression

(i) $3 \times a + 2 \times b$
(ii) $5 \times a - 2 \times b$

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Question 19 MARKS: I (1) II (1) ANSWER

Simplify each expression

(i) $5 \times p - 4$
(ii) $p \times p - q \times q$

Question 20 MARKS: I (1) II (1) ANSWER

Simplify each expression

(i) $8 - a \div 2$
(ii) $4 + m \times m \times 7$

Question 21 MARKS: I (1) II (1) ANSWER

Simplify each expression

(i) $8 \div (a + 4)$
(ii) $(b - 2) \div (3)$

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Question 22 MARKS: I (1) II (1) ANSWER

Write an expression form

(i) The sum of a, b and c
(ii) The difference between a and b

Question 23 MARKS: I (1) II (1) ANSWER

Write an expression form
(i) The product of m and n
(ii) The quotient p and q

Question 24 MARKS: I (1) II (1) ANSWER

Write an expression for

(i) The square of the product of a and b
(ii) The square root of the sum of a and b

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Question 25 MARKS: I (1) II (1) ANSWER

Write an expression for

(i) The perimeter of a rectangle of length L and width W
(ii) The area of a triangle of height H and base length B

Question 26 MARKS: I (1) II (1) ANSWER

Write an expression for

(i) The cost of 3 DVD's if one costs $\$m$.
(ii) The total cost of buying m oranges for $\$2$ and n pears at $\$3$.

Question 27 MARKS: I (1) II (1) ANSWER

Write an expression for

(i) The square root of the sum of the square of a and the square of b.
(ii) The square root of the quotient of L and g

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Question 28 MARKS: I (1) II (1) ANSWER

Find the value of $7x - 3$ if:

(i) $x = 4$
(ii) $x = -3$

Question 29 MARKS: I (1) II (1) ANSWER

Find the value of $\frac{a - b}{3}$ if:

(i) $a = 5,\ b = -4$
(ii) $a = -3,\ b = 9$

Question 30 MARKS: I (1) II (1) ANSWER

If $m = 4$ and $n = -2$ find

(i) $m^2 + n$
(ii) $m - n^2$

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Question 31 MARKS: I (1) II (1) ANSWER

The formula for the area of a triangle is $A = \frac{1}{2}bh$ where A is the area, b is the base length and h is the height.

Find the area of a triangle with base length $15\ \text{cm}$ and height $20\ \text{cm}$.

Question 32 MARKS: I (1) II (1) ANSWER

The formula for converting Celsius temperatures to Fahrenheit temperatures is $F = \frac{9}{5}C + 32$ where F is the temperature in Fahrenheit and C is the temperature in Celsius. Use the formula to convert 40° to Fahrenheit.

Question 33 MARKS: I (1) II (1) ANSWER

The formula for finding the circumference of a circle is given by $C = 2\pi r$, where C is the circumference, $\pi = \frac{22}{7}$ and r is the radius.

Find the circumference of a circle with a radius of $21\ \text{cm}$.

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Question 34 MARKS: I (1) II (1) ANSWER

Solve

(i) $x + 4 = 6$
(ii) $\frac{y}{3} = 7$

Question 35 MARKS: I (1) II (1) ANSWER

Solve

(i) $x - 5 = 11$
(ii) $8c = 56$

Question 36 MARKS: I (1) II (1) ANSWER

Solve

(i) $2x + 4 = 12$
(ii) $7x + 6 = 34$

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Question 37 MARKS: I (1) II (1) ANSWER

Solve

(i) $10 - 2m = 4$
(ii) $\frac{m}{4} - 2 = 8$

Question 38 MARKS: I (1) II (1) ANSWER

Solve

(i) $\frac{x - 6}{2} = 4$
(ii) $\frac{x + 1}{3} = 2$

Question 39 MARKS: I (1) II (1) ANSWER

Solve

(i) $\frac{2m}{3} = 12$
(ii) $2(m + 2) = 8$

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Question 40 MARKS: I (1) II (1) ANSWER

Solve

(i) $x + 5 = 11$
(ii) $x - 5 = 7$

Question 41 MARKS: I (1) II (1) ANSWER

Solve

(i) $p - 3 = -2$
(ii) $p + 4 = -6$

Question 42 MARKS: I (1) II (1) ANSWER

Solve

(i) $1 - x = 11$
(ii) $3 - x = -4$

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Question 43 MARKS: I (1) II (1) ANSWER

Solve

(i) $-3-x=4$
(ii) $-7-x=-2$

Question 44 MARKS: I (1) II (1) ANSWER

Solve

(i) $x+24=11$
(ii) $x+3=-16$

Question 45 MARKS: I (1) II (1) ANSWER

Solve

(i) $15-x=24$
(ii) $17-x=-12$

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Question 46 MARKS: I (1) II (1) ANSWER

Solve

(i) $3x = 24$
(ii) $5x = -35$

Question 47 MARKS: I (1) II (1) ANSWER

Solve

(i) $\frac{m}{4} = 5$

(ii) $\frac{m}{3} = -6$

Question 48 MARKS: I (1) II (1) ANSWER

Solve

(i) $\frac{-x}{3} = 11$

(ii) $\frac{-x}{2} = -5$

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Question 49 MARKS: I (1) II (1) ANSWER

Solve

(i) $-3x = 27$
(ii) $-4x = -16$

Question 50 MARKS: I (1) II (1) ANSWER

Solve

(i) $\frac{2x}{3} = 8$

(ii) $\frac{3x}{5} = 21$

Question 51 MARKS: I (1) II (1) ANSWER

Solve

(i) $\frac{2x}{7} = -4$

(ii) $\frac{6x}{5} = -24$

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Question 52 MARKS (1) ANSWER

Solve $2x - 5 = 11$

Question 53 MARKS (1) ANSWER

Solve $3x + 5 = 20$

Question 54 MARKS (1) ANSWER

Solve $\frac{x}{2} + 3 = 7$

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Question 55 MARKS (1) ANSWER

Solve $\frac{x}{3} - 5 = 9$

Question 56 MARKS (1) ANSWER

Solve $4 - 3x = 10$

Question 57 MARKS (1) ANSWER

Solve $-6 - 4x = -14$

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Question 58 MARKS (1) ANSWER

Solve $\frac{2x}{3} + 1 = 11$

Question 59 MARKS (1) ANSWER

Solve $3 - \frac{5x}{2} = -7$

Question 60 MARKS (1) ANSWER

Solve $5x + 7 = -38$

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Question 61 MARKS (1) ANSWER

Solve $3x + 5 = 9$

Question 62 MARKS (1) ANSWER

Solve $\frac{2x}{3} + 7 = -2$

Question 63 MARKS (1) ANSWER

Solve $4 - 5x = -7$

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Question 64 MARKS (1) ANSWER

Solve $1 - \frac{5x}{2} = 8$

Question 65 MARKS (1) ANSWER

Solve $7x + 4 = -6$

Question 66 MARKS (1) ANSWER

Solve $\frac{4x}{5} - 1 = 8$

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Question 67 MARKS (1) ANSWER

Solve $12x - 7 = 15$

Question 68 MARKS (1) ANSWER

Solve $-4 - \frac{6x}{5} = -5$

Question 69 MARKS (1) ANSWER

Solve $11 - \frac{2x}{3} = -4$

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Question 70 MARKS (1) ANSWER

A number has 6 subtracted from it and the result is 20. What is the number?

Question 71 MARKS (1) ANSWER

Alice mixed 620ml of white paint with some green paint. She mixed 2.45L of paint altogether. How much green paint did she use?

Question 72 MARKS (1) ANSWER

When a certain number is doubled and subtracted from 40, the result is 16. What is the number?

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Question 73 MARKS (1) ANSWER

Mr Jones says, "if you multiply my age by three and add 10, the answer is 133." How old is Mr Jones?

Question 74 MARKS (1) ANSWER

The perimeter of a rectangle is 120 cm and its width is 20 cm. What is the length?

Question 75 MARKS (1) ANSWER

A plumber, charging for a job, uses the formula $C = 102h + 52$, where C is the charge in dollars and h is the number of hours the job takes. Find the number of hours worked if the charge is $\$1174$.

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Question 76 MARKS (1) ANSWER

The volume of a rectangular prism is given by the formula $V = LBH$. What is the value of H when $V = 336$, $L = 8$ and $B = 7$.

Question 77 MARKS (1) ANSWER

The weekly profit, in dollars, made by a widget store is given by $P = 4W - 800$, where W represents the number of widgets sold. Find the number of widgets sold if the profit is $\$480$.

Question 78 MARKS (1) ANSWER

Jack is 6 years older than Jill. If the sum of their ages is 18, find their ages.

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Chapter 2

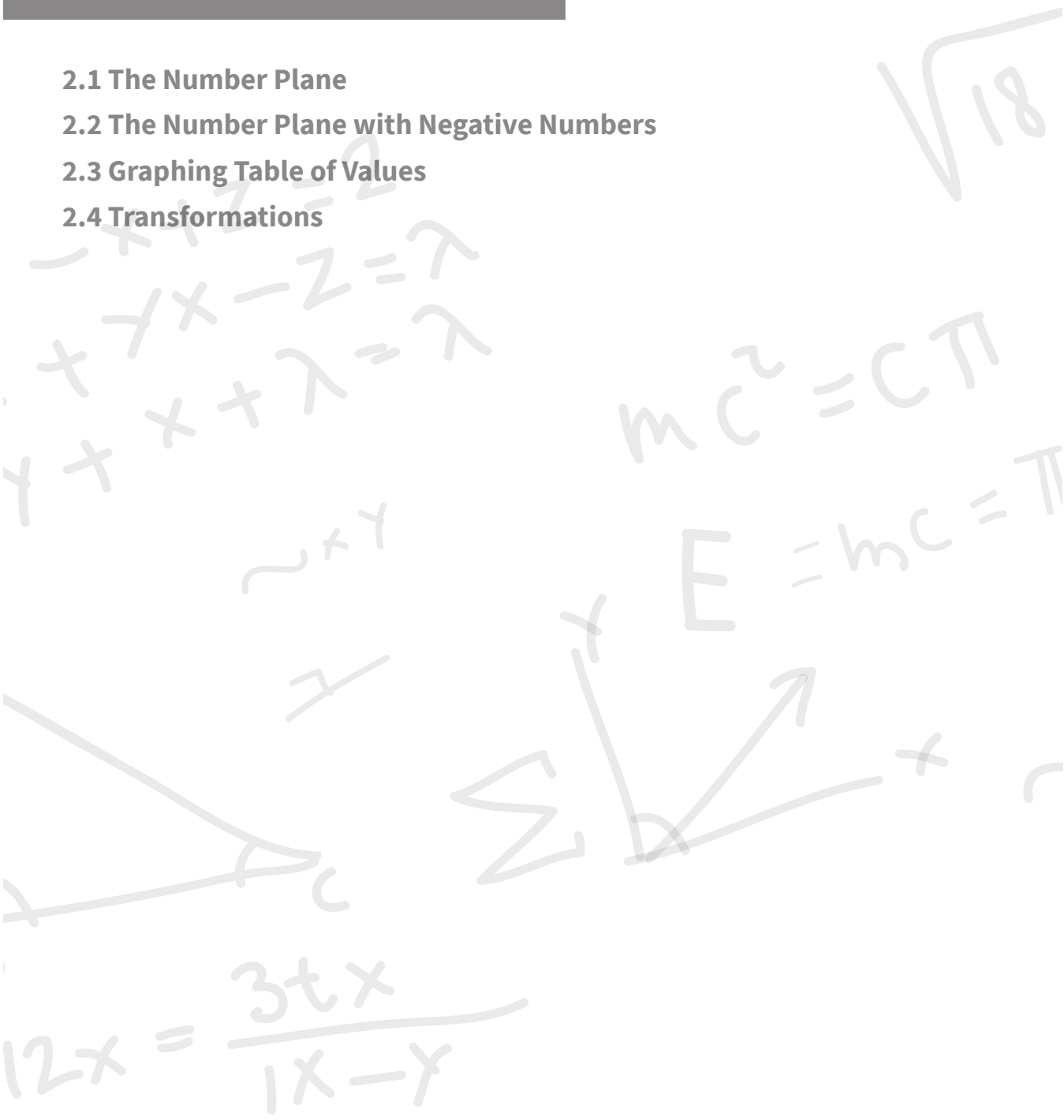
Number Plane

2.1 The Number Plane

2.2 The Number Plane with Negative Numbers

2.3 Graphing Table of Values

2.4 Transformations



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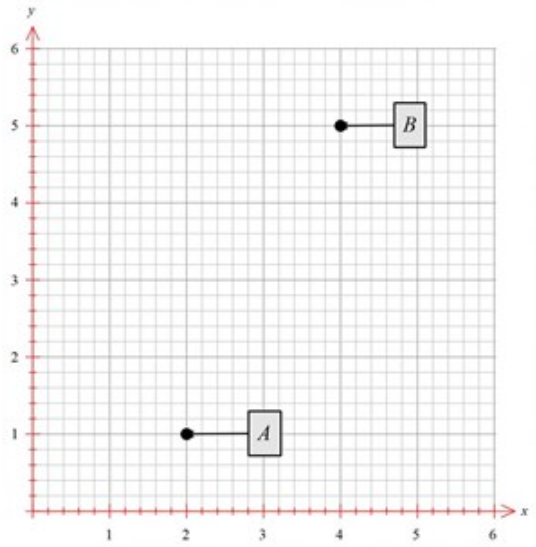
Question 79 MARKS (1)

ANSWER

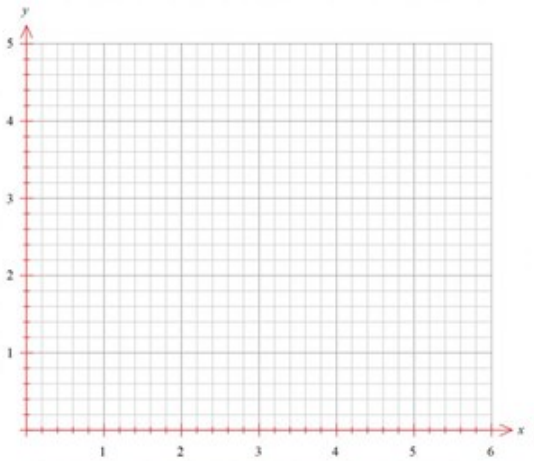
Write down the coordinates of each shown on the number plane.



Question 80 MARKS (1)

ANSWER

On the number plane, plot the points $A(1,1),\ B(4,1)$ and $C(4,3)$. Join these points to form the triangle ABC. Name the right angle in the triangle.



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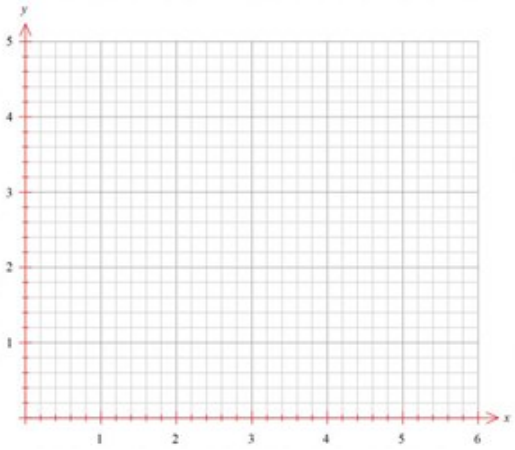
Question 81 MARKS (1)

ANSWER

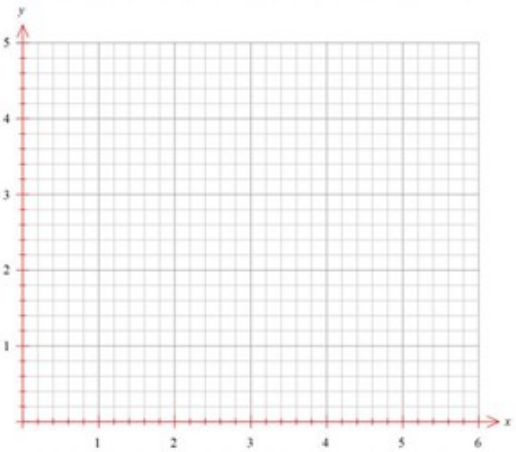
Plot and join the points $A(1,2), B(5,2)C(1,4)$. Find the area of triangle ABC.



Question 82 MARKS (1)

ANSWER

Plot and join the points: $A(1,1), B(1,3), C(5,3)$ and $D(5,1)$. Find the area of the shape.



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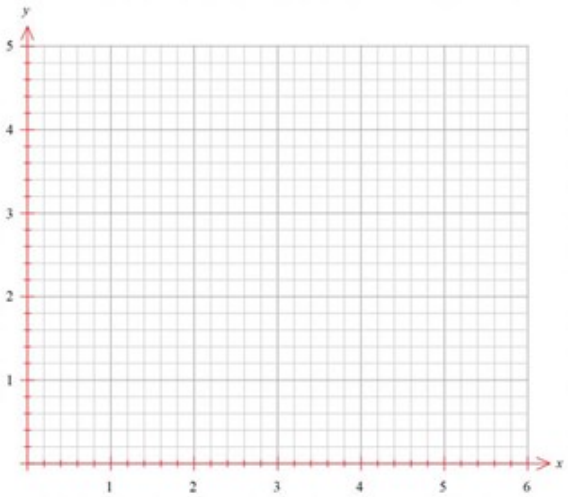
Question 83 MARKS (1)

ANSWER

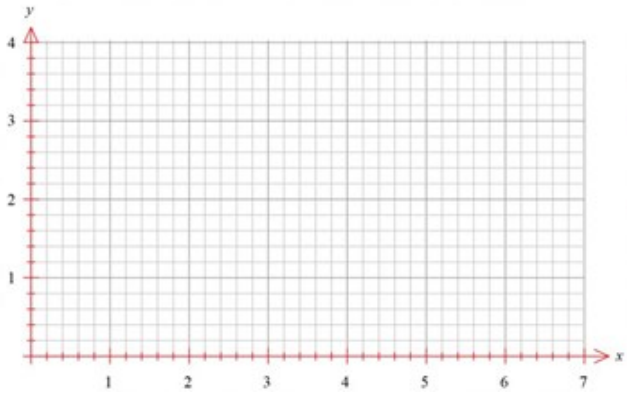
Plot and join the points:
$A(1,1), B(1,3), C(5,3)$ and $D(5,1)$.
Find the perimeter of the shape.



Question 84 MARKS (1)

ANSWER

Plot the points
$A(1,1), B(2,3), C(6,3)$ and
$D(5,1)$. Given that $AB = 2.2$, find the perimeter of the shape.



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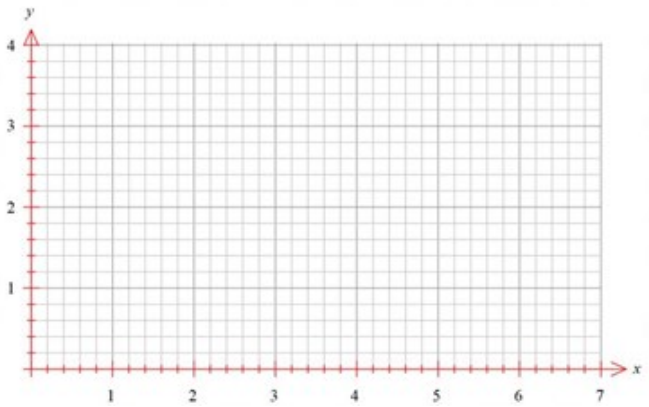
Question 85 MARKS (1)

ANSWER

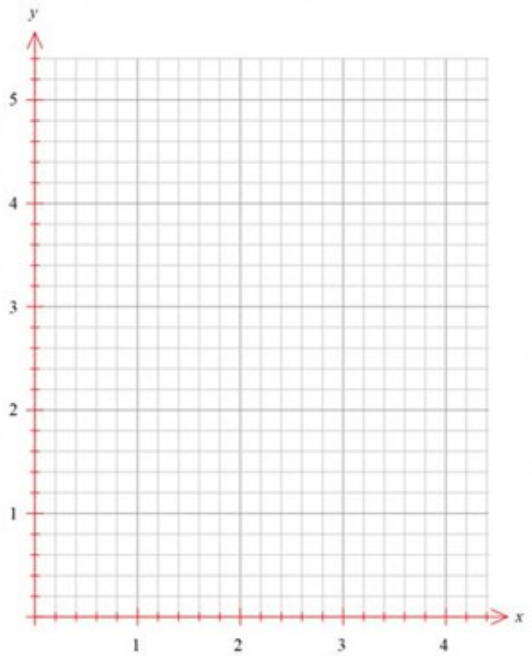
Plot the points
$A(1,1), B(2,3), C(6,3)$ and
$D(5,1)$. Find the area of the shape.



Question 86 MARKS (1)

ANSWER

Plot and join the points:
$A(1,1), B(1,5), C(2,5)$
$D(2,3), E(4,3), F(4,1)$.
Find the area of the shape.



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Question 87 MARKS: I (1) II (1) ANSWER

In which quadrant do the following points lie.

(i) (3,4)

(ii) (-3,4)

Question 88 MARKS: I (1) II (1) ANSWER

In which quadrant do the following points lie.

(i) (-5,-7)

(ii) (5,-7)

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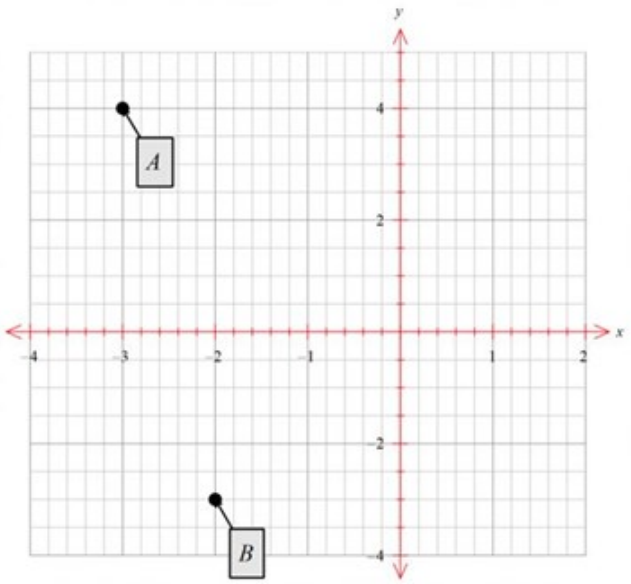
Question 89 MARKS: I (1) II (1)

ANSWER

From the number plane find the coordinates of

(i) A

(ii) B



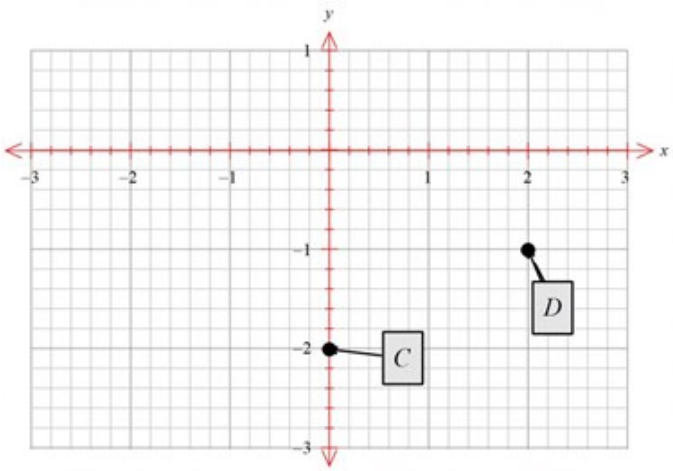
Question 90 MARKS: I (1) II (1)

ANSWER

From the number plane find the coordinates of

(i) C

(ii) D



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Question 91 MARKS (1) ANSWER

The points $A(0,4)$, $B(1,1)$ and $C(2,b)$ are collinear. What is the value of b?

Question 92 MARKS (1) ANSWER

The points $A(-2,1)$, $B(-1,3)$ and $C(0,b)$ are collinear. What is the value of b?

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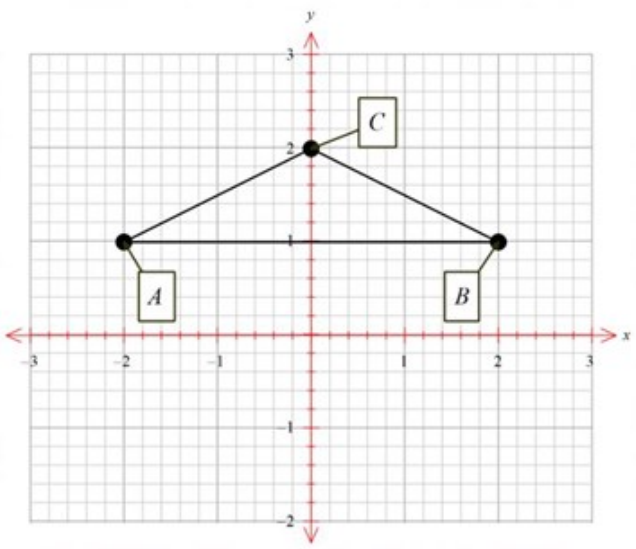
Question 93 MARKS (1)

ANSWER

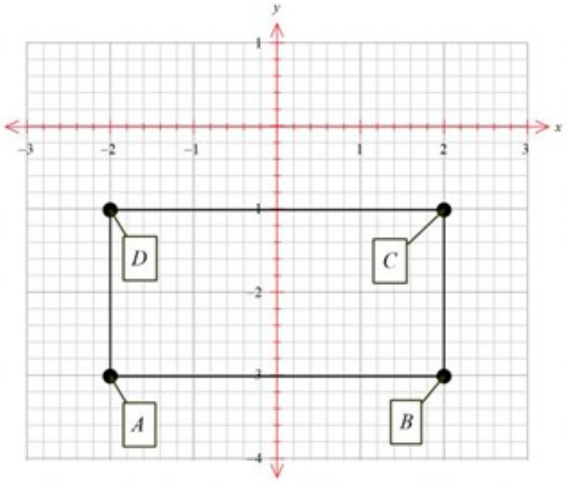
Write down the coordinates of A, B and C and determine the area of $\triangle ABC$



Question 94 MARKS (1)

ANSWER

Write down the coordinates of A, B, C and D and determine the area of the rectangle.



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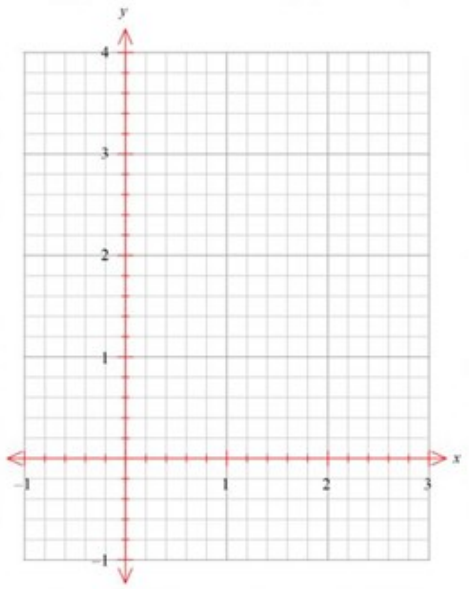
Question 95 MARKS (1)

ANSWER

Plot and join the points, from the points of values,on the number plane

x	2	2	2
y	1	2	3

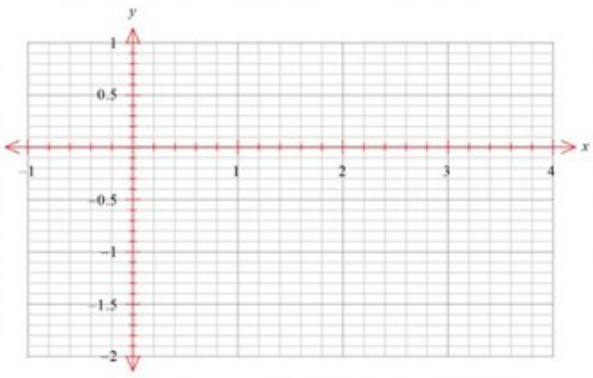


Question 96 MARKS (1)

ANSWER

Plot and join the points, from the table of values, on the number plane

x	1	2	3
y	-1	-1	-1



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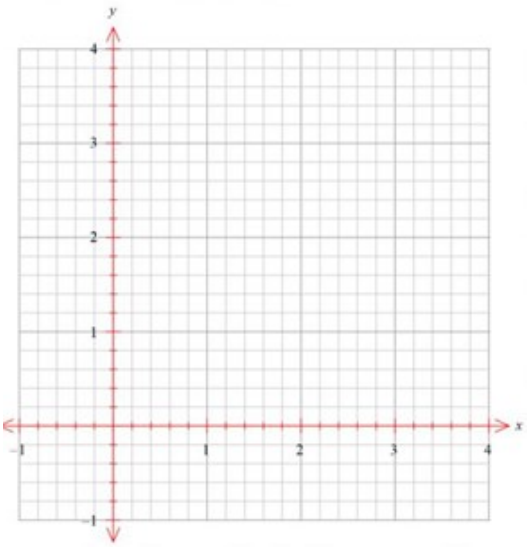
Question 97 MARKS (1)

ANSWER

Plot and join the points, from the table of values, on the number plane.

x	1	2	3
y	1	2	3

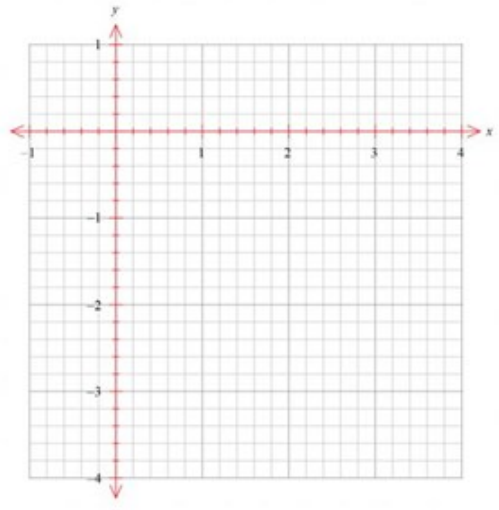


Question 98 MARKS (1)

ANSWER

Plot and join the points, from the table of values, on the number plane

x	1	2	3
y	-1	-2	-3



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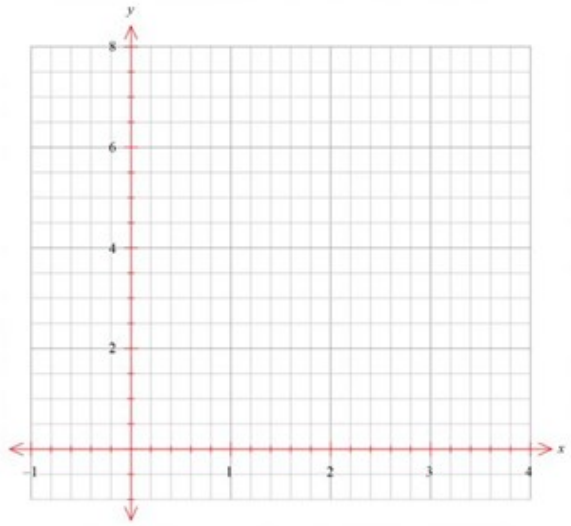
Question 99 MARKS (1)

ANSWER

Plot and join the points, from the table of values, on the number plane

x	1	2	3
y	3	5	7

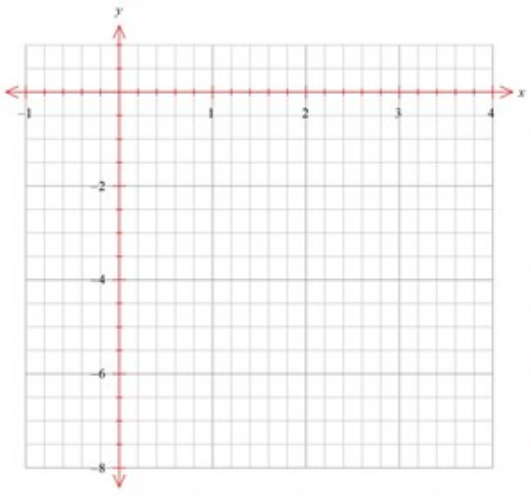


Question 100 MARKS (1)

ANSWER

Plot and join the points, from the table of values, on the number plane

x	1	2	3
y	-3	-5	-7



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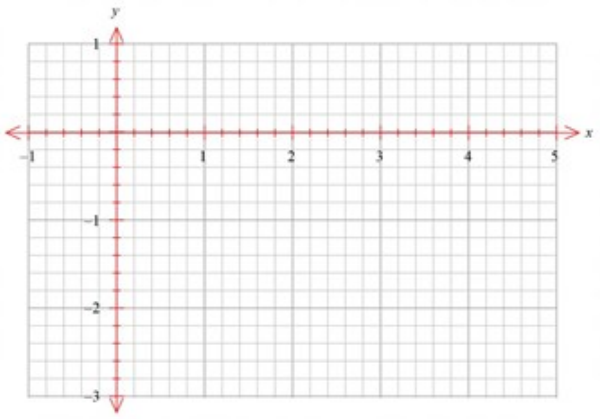
Question 101 MARKS (1)

ANSWER

Plot and join the points, from the table of values, on the number plane

x	0	2	4
y	-2	-1	0

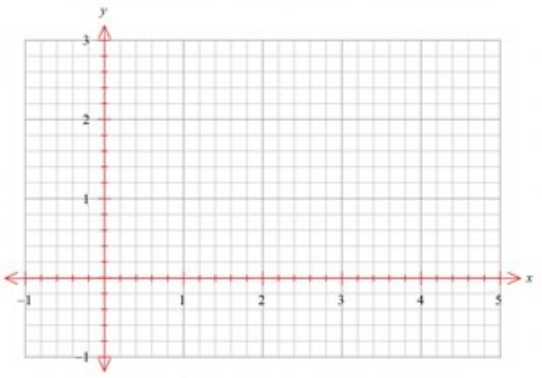


Question 102 MARKS (1)

ANSWER

Plot and join the points, from the table of values, on the number plane

x	0	2	4
y	2	1	0



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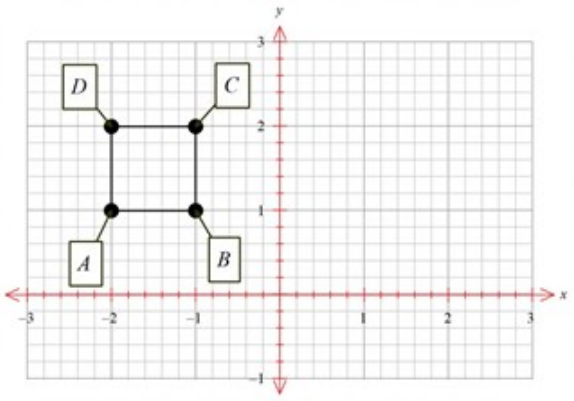
Question 103 MARKS (1)

ANSWER

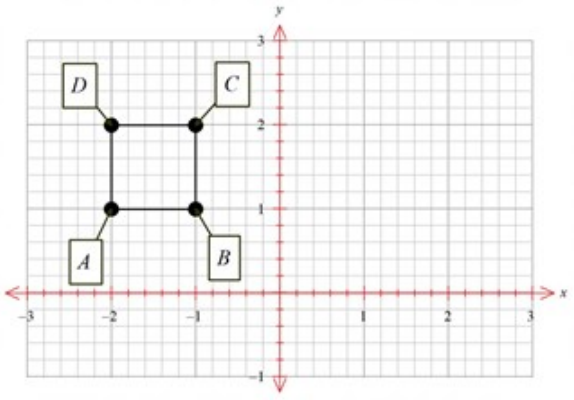
The square ABCD is translated 3 units to the right and 1 unit down. Draw the translated square $A'B'C'D'$ on the number plane.



Question 104 MARKS (1)

ANSWER

The square $ABCD$ is reflected about the y-axis. Draw the reflected square $A'B'C'D'$ on the number plane.



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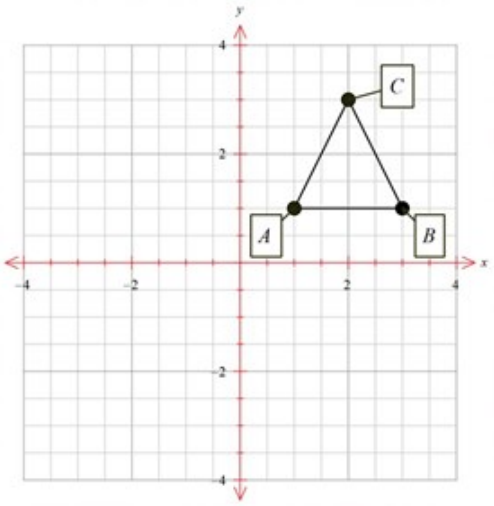
Question 105 MARKS (1)

ANSWER

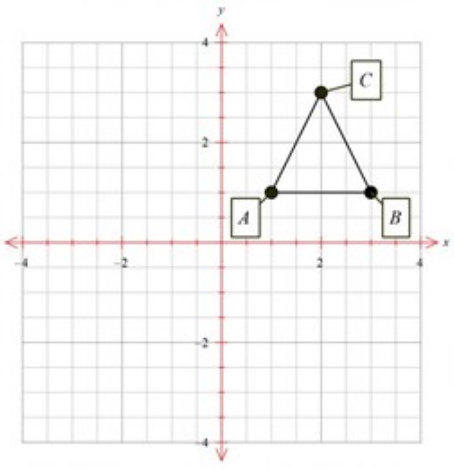
The triangle ABC is reflected about the x-axis. Draw the reflected triangle $A'B'C'$ on the number plane.



Question 106 MARKS (1)

ANSWER

The triangle ABC translated 4 units down. Draw the translated triangle $A'B'C'$ on the number plane.



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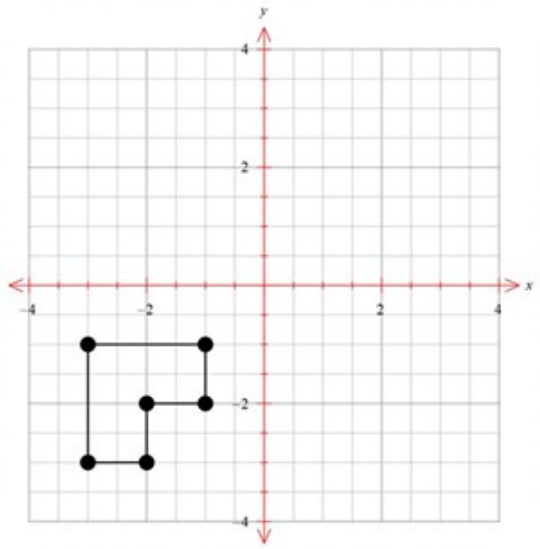
Question 107 MARKS (1)

ANSWER

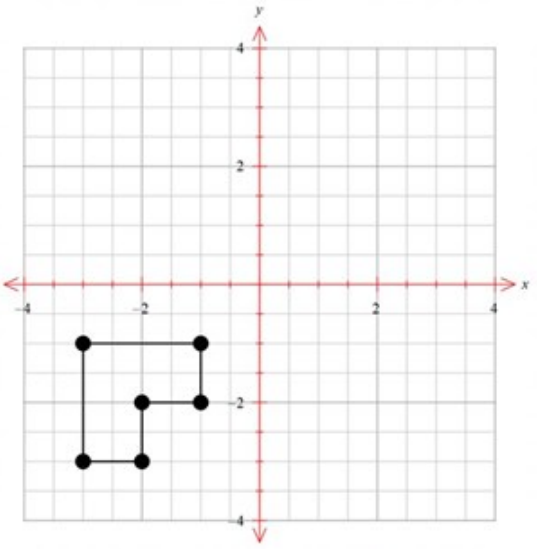
The shape is reflected about the x-axis. Draw the reflected shape on the number plane.



Question 108 MARKS (1)

ANSWER

The shape is translated 4 units to the right. Draw the translated shape on the number plane.



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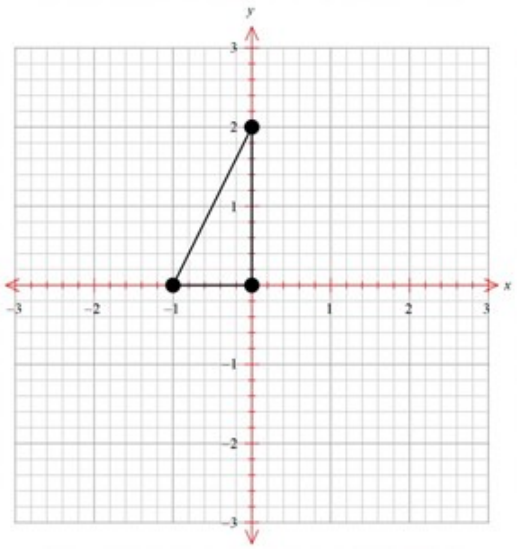
Question 109 MARKS (1)

ANSWER

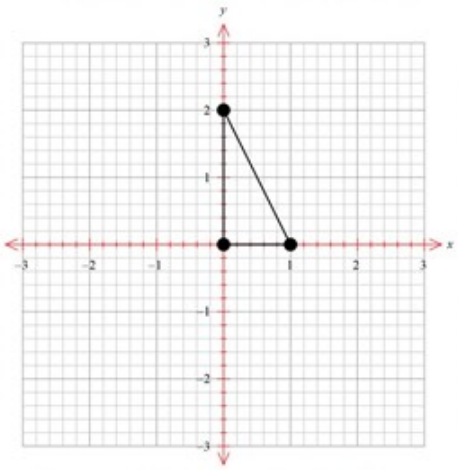
The triangle is rotated 180° about the origin. Draw the rotated triangle on the number plane.



Question 110 MARKS (1)

ANSWER

The triangle is rotated 180° about the origin. Draw the rotated triangle on the number plane.



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